ative that efforts be made to preserve this land, or at least prevent rough use by the military in training, mostly foreign troops at that! In the January/February 1997 issue of International Wildlife (27:9), it was reported that the National Wildlife Federation and its Louisiana affiliate had defeated the proposal in Congress to allow this transfer of 85,000 acres on the basis that proper environmental impact studies had never been done, and a public hearing had never been accomplished.

Joseph Yeo (60 Toh Tuck Road #02-08, Singapore 596723, Republic of Singapore)

I went on a field trip to Johore, Malaysia, on the 9th of August to find *Nepenthes*. Most of the local lowland species I found were identified *(N. rafflesiana, ampullaria,* and *gracilis*). Several hybrids were also found—N. *gracilis* × *rafflesiana, N.* × *hookeriana, and N.* × *trichocarpa* (the last two hybrids are *N. rafflesiana* × *ampullaria* and *N. gracilis* × *ampullaria* respectively—ed.). The natural hybrid *N. gracilis* × *rafflesiana* is rarely seen in nature. Several forms of *N. rafflesiana* (black and spotted), N. *gracilis* (pink to maroon), *N. gracilis* (all green and green upper pitchers, maroon lower pitchers), and *N. ampullaria* (green and spotted), were found along a 1-1.5 km stretch, except for 200 metres of very dry ground where *N. gracilis* (small pink form) was found only. Otherwise, the three species and hybrids can be found growing together.

I also managed to collect seed of *N. ampullaria, N. gracilis* and *N.* × *hookeriana*. I have sown some and distributed most of them to growers and CP societies. I have also sent some to the ICPS seed bank.

Some of the *N. hookeriana* have very nice lower pitchers. They look like fat and stunted *N. rafflesiana.* Another rare occurrence is the upper pitcher of *N. ampullaria.* The upper pitcher of *N. ampullaria* is seldom seen in its natural habitat. I enclosed a picture of the *N. ampullaria* sighted. The picture shows a male flowering *N. ampullaria* with the two upper pitchers. The other photos were taken from the same field trip.

(Joseph wrote that he is interested in contacting other *Nepenthes* growers for exchange of seed and information. His address is 60 Oh Tuck Road #02-08, Singapore 596723, Republic of Singapore—ed.)

Literature Review

Adamec, L. 1995. Ecological requirements of *Aldrovanda vesiculosa* . Testing of its new potential sites in the Czech Republic. Acta Bot. Gallica 142: 673-680.

Adamec, L. 1995. Ecophysiological study of the aquatic carnivorous plant *Aldrovanda vesiculosa L.* Acta Bot. Gallica 142:681-684.

These two closely related and consecutively appearing papers relate valuable information on *Aldrovanda* in its natural habitat—in this case, Poland—as well as requirements for growth and metabolism. In the first study in an attempt to determine the possibility of naturalizing the species in the Czech Republic, either five or ten plants were placed in each of ten selected sites that resembled the locations in Poland where the species is still found, although in smaller numbers now due to mysteriously decreasing turion survival. The plants were originally obtained from Poland but were cultivated by the author and these cultivated

plants were the source of explants. During the warm summer, growth was quite successful in most locations with the 5-10 plants resulting in 38-141 turions per site by summer's end. The most suitable locations contained sedges in the water with duff and rotting plant debris on the bottom.

Waters were broadly circumneutral, had low NPK but higher levels of NH_4 and CO_2.

In the second paper, some basic studies were undertaken that indicated that the plants did best under highlight and warmth. Turions survived well over winter in waters of 4° C, but were killed when stored on moist filter papers or emptied growing containers when the temp dropped to -12° C.

It would be interesting to see the latter experiment extended to finer temperature gradations over a larger range, and noting the effects of storing the turions in neutral waters open to air. Even at -12° C, the turions might survive in sufficiently deep ice-covered water if there is still unfrozen water at the bottom where the turions rest.

Both papers are well done and should be read by those interested in this species for more detail than we can provide here. (DES)

Ellis, A.G. and Midgley, J.J. (1996) A new plant-animal mutualism involving a plant with sticky leaves and a resident hemipteran insect, Oecologia 106: 478-481

The headline of this important paper is somewhat misleading because the relationship between *Roridula* and bugs of the genus *Pameridea* is by no means new (cf. Lloyd, The Carnivorous Plants: 98, 1942), and the much more interesting findings of this article relate to physiology rather than ecology. There were five results of importance. 1. *Roridula* does not produce endogeneous proteolytic enzymes digesting captured prey (tested by a substrate film method). 2. *Roridula* captures considerable amounts of prey. 3. *Pameridea* finds and attacks any newly caught prey within minutes. 4. Labelling experiments with the stable nitrogen isotope ^{15}N showed that the nitrogen is translocated from prey to *Roridula*. The amount of this translocation was greatest in individuals of Roridula which were beset with *Pameridea*. 5. The authors suggest that excrements of *Pameridea* on the abaxial leaf surface are absorbed by *Roridula*.

Despite some errors (*Byblis* is reported to lack digestive enzymes although this has not been tested since the positive preliminary results by A.N. Bruce, Not. Roy. Bot. Gard. Edinb. 16:9-14, 1905; so a study similar to the present one is clearly indicated for *Byblis*!) this paper puts an end to some of the ongoing myths about carnivory in *Roridula*. The genus can be regarded as essentially noncarnivorous based on the fact that endogeneous digestive properties are definitely lacking (demonstrated here for the first time). The authors close: "Our results elevate *Roridula* to being the tallest (up to 2 m tall) and woodiest carnivorous plant. Darwin (1875) was right about *Roridula*, but for the wrong reason". However, *Triphyophyllum peltatum* (Dioncophyllaceae) is a liana, several tens of metres tall and woody in adult individuals (which are, however usually not carnivorous in this stage of development), and *Roridula* is only sub-carnivorous (in community with *Pameridea*). Ellis and Midgley (1996) were right about *Roridula*, but with wrong conclusions. (JS)

Fagerberg, W.R. and Howe, D.G. (1996) A Quantitative Study of the Tissue Dynamics in Venus's Flytrap *Dionaea muscipula* (Droseraceae). II. Trap Reopening, American Journal of Botany 83(7): 836-842.

This paper is a continuation of a previous one (Fagerberg & Allain, Am. J. Bot. 78:647-657, 1991) in which trap closure of *Dionaea muscipula* was studied. The authors have used normalized cell length (NCL) measurements of five cell layers and three trap regions of the trap lobes at various stages of reopening in order to elucidate tissue dynamics during this process. They found significant changes in NCL corresponding to the macroscopic morphological changes observed. The important point is that cells from adjacent layers within all regions of the trap lobes change at different rates during different stages. Once again, no physiological reason for the changes observed could be determined. The complex sequence of events is not a simple reversion of the likewise complex sequence observed in trap closure. No "motor cells" could be detected. As a result it can be summarized that in spite of considerable amounts of data obtained (not only in the present paper), the various (fast and slow) trap movements of *Dionaea* still remain far from being understood satisfactorily. (JS)

Godt, M.W. and J. L. Hamrick (1996) Genetic structure of two endangered pitcher plants, *Sarracenia jonesii* and *Sarracenia oreophila* (Sarraceniaceae), Am. J. Bot. 83: 1016-1023.

Regarding some aspects of taxonomy, pollination and insect associates, the bibliography of this paper is woefully incomplete and therefore some factual and/or technical errors have crept in. However, the basic thrust of the work is to determine the degree of genetic diversity of these two entities. Genetic diversity is important since those plants with low diversity will have less genetic "reserve", as it were, to respond to changes in environment and thus not do well. There is no direct or easy way to determine true diversity. The authors used a standard surrogate procedure of determining the isoenzymatic constituency of a small selected group of enzymes using electrophoresis. This procedure correlates with diversity in some plant species but not all and has limitations. Pitchers were collected from multiple sites, enzymes extracted and studies done. A brief summary of results indicates that overall genetic diversity is low for both species but especially critical for *S. rubra* subsp. *jonesii*: within each taxon, individual determinations from each location indicated that larger populations had greater diversity while smaller had less, as one might expect. (DES)

Luhrs, Hans. 1995. New additions to the genus *Pinguicula* (Lentibulariaceae) of Mexico. Phytologia 79:114-122.

They keep on rolling in! Two more new species of *Pinguicula* in old Mexico. Many more, and the genus in that country will be ripe for a monographic revision.

P. stolonifera has a unique character for Mexican *Pinguicula*: It forms a stolon with new plant budding at the tip, often more than one stolon per plant. The flower is red-purple and the species is placed in the section *Orcheosanthus* and seems most closely related to *P. oblongiloba.*

P. laxifolia is a smallish plant with pink or pale violet flowers and is so unique in several characters as to justify the new section *Orchidioides,* which is also

described. We are getting so many of these things that more sections are needed! The author presents cogent reasoning for the new section and suggests that several other Mexican species should be transferred to the new section. This is a well-done paper with very good descriptions and line drawings.

Stay tuned for more species! (DES)

Seine, R., *et al.* 1995. A neglected habitat of carnivorous plants: Inselbergs. Feddes Repertorium 106:555-562.

Inselbergs (the term monadnock is more commonly used in the US) are raised domes of granitic or gneiss rock that loom up over the countryside. They have persisted because they are more resistant to erosion. There is much bare rock on their surfaces, but crevices, dips, folds and cracks support a very thin soil in which often unusual plants grow. There are seasonal pools, seasonal seeps from beneath layers of mosses and occasional seasonal rivulets of runoff water. Most inselbergs occur in the tropics and their harsh, demanding habitat would seem an unlikely place for moisture loving CP, but they can thrive seasonally and lie dormant during drier times. The authors mention four genera *(Drosera, Utricularia, Genlisea and Nepenthes)* with 45 species that regularly occur on inselbergs throughout the world. These are listed by country. The authors discuss whether *Heliamphora* on tepui should also be considered. In the southeast United States, there is a series of monadnocks, most prominently a string beginning with Stone Mountain near Atlanta, Georgia, running through Rocky Face in Alexander County, North Carolina, and on to flatter domes near Raleigh. In the US, the only CP found in such situations are *Utricularia juncea* and *U. subulata.* (DES)

Worley, A. C. and L. D. Harder. 1996. Size-dependent resource allocation and costs of reproduction in *Pinguicula vulgaris* (Lentibulariaceae). J. of Ecol. 84:195-206.

Two sites where *P. vulgaris* grows in Alberta, Canada, two opposite shady shores of the same river, were monitored. Energy allocation to growth varied negatively to plant size The larger the plant, the less it grew in a season. But resource allocation for gemmae production (the little side buds on the winter hibernacula) and seed biomass produced varied positively with plant size: The larger the plant, the more seed and gemmae. Smaller plants did produce seed-bearing flowers and gemmae, but fewer seed and buds than larger plants did. Reproduction affected vegetative propagation and growth independently, growth was favored over vegetative reproduction, and reproduction was quite costly. (DES)

Book Review

Insectivorous Plant Society (Japan) (1996) Carnivorous Plants—Species and Cultivation, 170 pp., Nippon Dental College, Tokyo. ISBN4-416-496001

This Japanese publication adds another profusely illustrated compendium covering (almost) all groups of carnivorous plants to the works of similar scope. Nevertheless, it deserves special attention. The booklet contains no less than 316